XXXVII.—*Remarks on the Genera* Trimerella, Dinobolus, *and* Monomerella. By Thomas Davidson, F.R.S., F.G.S., &c., and William King, Sc.D., Professor of Mineralogy and Geology in Queen's College, Galway.

The genera named in the title constitute, in our opinion, a new family, belonging to the helictobrachial section of the class *Palliobranchiata* or *Brachiopoda*. We propose to designate it *Trimerellidæ*, after the type genus. Although more or less treated of by other writers, we have been induced, especially by the desire of several intimate friends, who have kindly supplied us with the loan of some valuable series of specimens, and presented us with others, to undertake the further elucidation of a most difficult and enigmatical group of shells; and for this assistance our thanks are especially due to Lindström, Walmstedt, Billings, Hall, Whitfield, Meek, and others. These "Remarks," it is necessary to state, are merely preliminary to a detailed memoir we have been preparing for some time past, and which we hope to have completed for the Geological Society in the early part of next session.

The Trimerellids differ much from all others of their class; though their proximate alliance to certain forms seems to admit of determination. We think there is little doubt of their being not only structurally related to the *Lingulidæ* *, but also genetically connected with this family. The first point is of considerable interest, inasmuch as the Lingulids are the *earliest* Palliobranchs that geologists are acquainted with, occurring in Cambrian rocks; while the Trimerellids do not seem to have been in existence prior to the next systemal group, all the forms belonging to the Lower and Upper Silurians. It would therefore appear that the Trimerellids, adopting the doctrine of genetheonomy (by which we mean evolution of species effected mainly through the operation of Divine laws, and not by purposeless or accidental modifications†), have been produced out of the Lingulids. Moreover, considering that the earliest Palliobranchs, taking them to be represented by the existing aniferous Lingulas, are of a simpler type than the non-aniferous Terebratulids and Rhynchonellids that succeeded them, the conclusion suggests itself that the latter and *simpler* groups are the degraded successors of a type that existed in the earliest known Life-period of our planet. Another matter for consideration is the fact that the Cambrian Lingulids were furnished with a framework of a horny or

* For the present we include *Obolus* and other related genera in the *Lingulidæ*—though we are strongly inclined to regard the genus named as typical of another family, *Obolidæ*.

† See 'Geologist,' vol. v. p. 254.

slightly calcareous nature, as was generally the case with their contemporaneous Cœlenterates and Crustaceans, making it doubtful that ordinary marine calcium compounds were important solutions in the seas of their period; while the fact that the Trimerellids had essentially a calcareous framework, as was the case with a vast number of their coeval organisms, seems to show not only that such compounds had increased in the Silurian seas, but further to support the conclusion that the family we are engaged with is a post-genetheonomic branch of the Lingulids. With the physical changes indicated, the shells of the present family underwent important modifications compared with the group from which they presumedly originated.

The Trimerellids are strongly differentiated by the variety and form of their parts. The species, in general remarkably distinguished by their massive umbonal region, have, speaking subject to correction, the ventral or rostral valve characterized by possessing twenty-four different parts, their dorsal one having sixteen. Many of the parts are so unlike what are seen in other families as to defy all attempts to determine their uses or functions. One consideration that strikes us forcibly is that such parts as the teeth and cardinal process (essentials in other Palliobranchs) are exceedingly mutable, not only in a genus, but in a species: besides, they are rarely well defined. The teeth may be large and crude in certain individuals, but rudimentary or obsolete in others of the same species. The cardinal process may be a thick projecting lamina, or rude in shape and massive, or absent altogether. The deltidium seems to be less liable to modifications: situated on a well-developed area, it is bounded by two rather prominent ridges, one on each side, with their inner and projecting terminations serving as teeth. The usual areal border lies on the outside of each of the deltidial ridges. The deltidium itself is, in general, wide and transversely marked with strong lamina-like lines: it presents the appearance of being excavated out of the areal face (or underlying solid portion) of the beak, agreeing in this respect with what obtains in *Lingula*. In our forthcoming memoir it will be shown that another part, the deltidial slope, further testifies to the close affinity between the Trimerellids and the last-named genus. The hinge or cardinal plate, which requires more explanation than can be given on the present occasion, is so variable in one species (*Trimerella Lindströmi*) as to be with difficulty recognized in some individuals. The hinge-wall, as will shortly be seen, is equally subject to variation. The umbo or beak, which is usually prominent, presents itself under different appearances. Some-

what constant in form, it may, according to the species, be subconical and massive, or compressed into a thin V-shaped plate: in one genus it is obtusely rounded. In the first of these conditions it may be solid or double-chambered: the chambers are separated by either a thick or a thin partition; and they are shallow and wide-mouthed, or long and tubular. We are not acquainted with any thing strictly resembling the partition in other Palliobranchs. In *Pentamerus*, it is true, the umbonal cavity is divided by a medio-longitudinal plate, giving rise to two lateral chambers: in this last genus, however, the dividing plate is double, causing it, when a specimen is suitably struck with the hammer, to split lengthwise into two halves; but no such division has occurred to us in any specimens of Trimerellids. The undivided condition of the partition seems to be explained on the view that this part is a modified form of the hinge-wall. Passing to the parts seen in the general or valvular cavity of the Trimerellids, the principal are the great muscle-bearing platforms, of which an example occurs in each valve. A similar homologous duplication characterizes other families—Pentamerids, Leptænids, &c.; but the myophores generally occur under a widely different shape. In the typical genus of the present family the platforms are elevated and doubly vaulted, the vaults being tubular and separated by a partition. The latter part is continued beyond or in advance of each platform, where it becomes the ordinary medio-longitudinal septum. A tendency to double-vaulting may be observed in the myophores of some other Palliobranchs, particularly *Leptæna Dutertrii*; in which the ventral one curves over and rests upon the medio-longitudinal septum, forming thereby a doubly vaulted arch. But the nearest approach to this peculiarity, as pointed out by Billings, is undoubtedly presented by the genus *Obolus*, in which certain muscle-bearing scars, usually excavated, have an overlapping posterior margin: in *Crania* something similar is seen. The platforms, with their tubular vaults and biconvex surface, remind one of a double-barrelled pistol. With a pair of this kind associated, as is often the case, with a couple of tubular umbonal chambers, the interior of *Trimerella* presents a singular appearance. In *Monomerella* both platforms are solid and slightly raised; and consequently the absence of vaults gives the interior of this genus a totally different aspect: the umbonal cavity, however, contains two large chambers. *Dinobolus* has neither a vaulted platform, nor a chambered umbo. Each of these three genera contains species in which the myophores vary considerably, being reduced to so rudimentary a condition that it is difficult to allocate the species generically. Hall has been induced to

raise an aberrant species of the kind to the rank of a genus, *Rhynobolus*; but this step appears to us to be attended with considerable disadvantage, as it would necessitate instituting a genus for every aberrant form. The scars are numerous and exceedingly complicated by the modifications of the different parts, as just pointed out. After some consideration we have abandoned the attempt to homologize them, except in a few cases. We think the posterior crescent, with its loop and lanceolate scars, corresponds to the post-aponeural impressions in *Lingula* and *Discina*. We are unable to specify which scars have been produced by the valvular muscles, except some situated on the platforms: and with respect to the latter, our efforts to identify them with the valvulars of *Lingula* (the nearest living representative, as we believe) have not, it is to be apprehended, been attended with much success. We have, for the reasons stated, refrained as far as possible from employing terms for the different scars implying their uses, and have, instead, simply given them names denoting their relative position, distinguishing the group in the dorsal valve from that of the ventral one by a different type. Certain scars, or other parts, apparently occupying the same relative positions in the two valves, and which appear to be analogous, bear the same letter, but in a different type: nothing more is meant by this mode of lettering.

The geographical distribution of the Trimerellids is a matter of some importance. Eminently a Silurian group, one might have expected the well-explored region which the labours of Murchison have made classical would have yielded an abundance of examples; but it is remarkable that only a few specimens of a single genus, *Dinobolus*, and apparently the last of their race, have been met with, in the Wenlock limestones and shales near Dudley, and discovered for the first time in 1852. Identical deposits in Gothland contain the same species; but a greater variety of the family occurs rather abundantly in rocks of the "Aymestry" age of that remarkable locality. Canada and adjacent districts in the United States have yielded the greatest variety of species, all of which, with the exception of *Dinobolus canadensis* and *D. magnifica*, are referable to the Upper Silurians. The two species last named occur in the Black-River limestone, a rock which appears to be equivalent to the Upper Llandeilo, or to the base of the Caradoc of this country. A species of *Monomerella* has also been found in Livonia (Russia) in rocks corresponding in age with those in which the same genus occurs in Gothland.

Our labours on the Trimerellids have enabled us to confirm, for the most part, the conclusions of previous writers as to

the number of species, and to determine the existence of some others. The three genera are severally constituted in species as follows:—

Trimerella grandis, *Billings.*
—— acuminata, *Billings.*
—— Lindströmi, *Dall.*
—— Billingsii, *Dall.*
—— ohioensis, *Meek.*
—— Dalli, *Dav. & King.*
—— wisbyensis, *Dav. & King.*
Dinobolus Conradi, *Hall.*
—— canadensis, *Billings.*
Dinobolus galtensis, *Billings.*
—— Davidsoni, *Salter.*
—— transversus, *Salter.*
—— Woodwardi, *Salter.*
—— magnifica, *Billings.*
Monomerella Walmstedti, *Dav. & King.*
—— prisca, *Billings.*
—— orbicularis, *Billings.*

With one or two exceptions, all the species will be fully illustrated in five lithographic plates in our forthcoming memoir; in addition to which there will be two woodcut plates of diagram figures explaining the various parts briefly noticed on the present occasion, and another showing the relationship of *Lingula* to the family.

XXXVIII.—*On two new Species of Birds from the Philippine Islands.* By Arthur Viscount Walden, P.Z.S., F.R.S.

Hyloterpe philippinensis, n. sp.

Feathers of the chin, cheeks, throat, and upper breast silky white, edged more or less with cinereous, a dingy sordid aspect being thus given to these parts; an indistinct obscure zone crossing the breast and bordering the upper breast-plumage, consisting of feathers which are dark ashy at their base, then pure white, tipped with dirty yellow; the remainder of the under plumage with the flanks and under tail-coverts sulphur-yellow, each feather, however, being iron-grey at the base and then white; entire head dark smoke-brown, lighter on the ear-coverts; remainder of upper plumage olive green, rather darker on the outer edges of the quills and on the rectrices; under carpals and axillaries pale lemon-white; tail slightly forked; bill horn-brown.

Longitudo

Rostr. a nar.	Alæ.	Caudæ.	Tarsi.
0·32	3·25	3·12	0·75

From an example obtained in Luzon by Dr. B. Meyer and labelled a "male."

Orthotomus castaneiceps, n. sp.

Entire head, lores, streak under the eyes, and the ear-coverts chestnut; nape and interscapulary region dark ashy, with